Melanin: energy o the future

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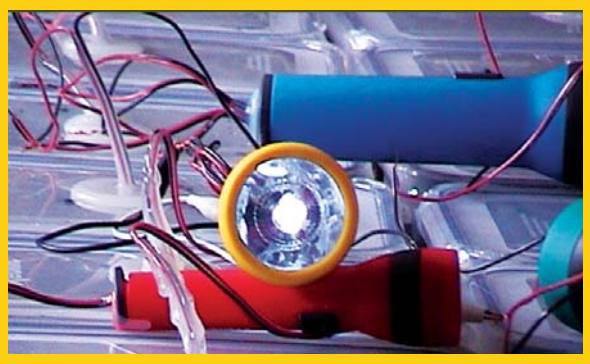
DR.A S H



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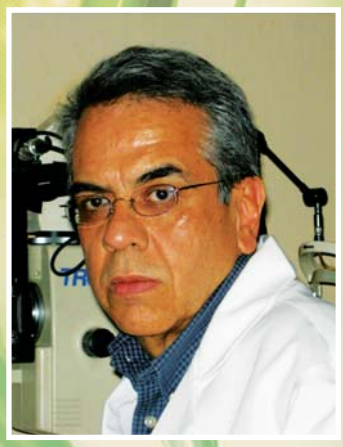
Mexico, 2011



Dr. Artur
o Solís
H errere

Born in Mexico City on August 19, 1953.

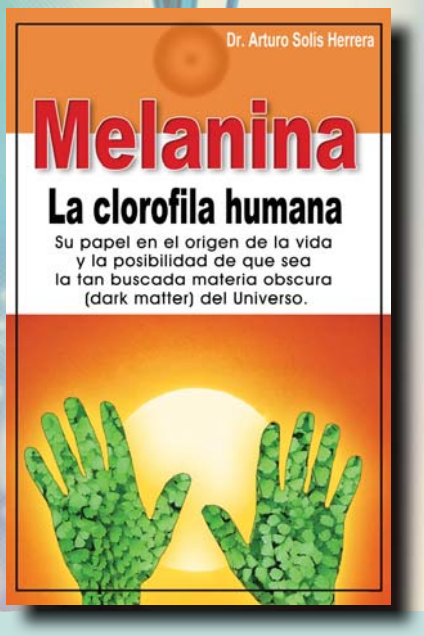
Completed elementary studies at the Luis Hidalgo Monroy Sc hool, annexed to the National School of Teachers; continued Pre-vocational number 4 at the National Polytechnic Institut e (IPN) and Vocational No. 9 Juan de Dios Bátiz, of the IPN.

Medical Surgeon from the Superior School of Medicine of the IPN, O phthalmologist by the UNAM and the Conde de Valenciana Hospital.

He studied the specialty of Neuro Ophthalmology at the Nati onal Institute of Neurology and Neurosurgery,

He obtained a Master's degree in Science from the Universid ad Autónoma de Aguascalientes and ultimately, he earned a Ph.D. in Pharmacology from the University of Guadalajara.

In 2009, he wrote the book "Melanin, The Chlorine of the Human".



Melanin: Energy of the Future

We have achieved, for the first time, the alternate generation of electrical energy through self-renewing photoelectrochemical cells that separate a nd recombine hydrogen from water. This is a fundamental scientific adva nce that allows us to fully enter the hydrogen era.

D r. Arturo s Olís Herrera

AND In 1990, we started, in my laboratory in Aguascal ientes, to use computerized methods to study th e three main causes of blindness in Mexico. Thes e methods allowed us to analyze the retina and t he nerve in the living organism in a manner very similar to the technique called spectrophotomet ry. That is, a specific wavelength is applied and a n image or characteristic response is obtained.

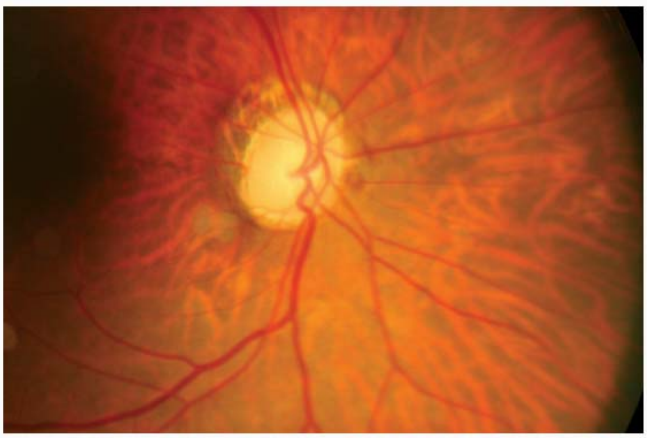


Fig. 1. In this image, we observe with great detail th e optic nerve that is this circular structure, which m easures the equivalent of 12 human hairs together.

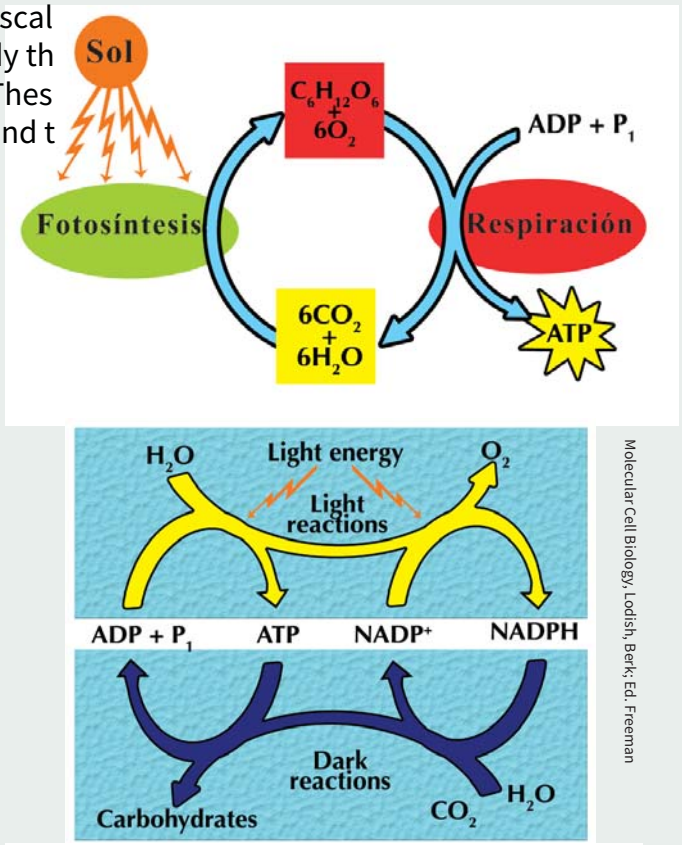


Fig. 2. Traditional scheme of photosynthesis in vegetables.

When changing the wavelength and/or putting media and filters, as penetration radars, it is obtained by im ages that provide important information to EVA -uar e ye diseases. During this investigation, we detect the i mportant function of a substance, melani-na, also ch emically known as polyhydroxyindol, because it has e xtraordinary properties and all of them contribute to protect the fabric, but none explained a proprietary Tecction so constant and so complete.

We obtained artificially the first 20 milliliters demel anin for the first time in 1998, because my idea was that if we insisted on the eye, we could obtain pro per therapeutic effects. The therapeutic results hav e been impressed, far beyond what we expected.

He took twelve years, from 1990 to 2002, understand how

This substance worked so effectively that it confirmed our hypothesis –even incredible to us ourselves– that it delivers hydrogen to the cell. That is, it captures photonic energy and transforms it into chemical energy. This left us astonished because hydrogen is the smallest atom, the most abundant in the Universe, and it is the carrier of energy that nature uses the most.

For the sake of clarity, we define photosynthesis as the absorption of photons from electromagnetic radiation, which results in the initiation of an ionic event. Until now, chlorophyll is accepted as the only substance widely distributed in nature that is capable of delivering hydrogen to the plant cell.

It was not conceivable that another substance in eukaryotic cells (mammals, fish, birds, insects, etc.) could, by capturing photons from electromagnetic radiation, obtain the necessary energy to split the water molecule. The results obtained with melanin confirm that not only plants perform photosynthesis, but also all mammals, including any living being whose genetic code expresses melanin. That is, melanin is to the animal kingdom what chlorophyll is to the plant kingdom.

As can be observed in Fig. 3, both compounds have some similar aspects, among which the reaction center where the 4 nitrogens (the 4 N) are located stands out.

With melanin, it seems that nature made a superchlorophyll, because chlorophyll has a single reaction center but melanin has hundreds of reaction centers per gram of substance.

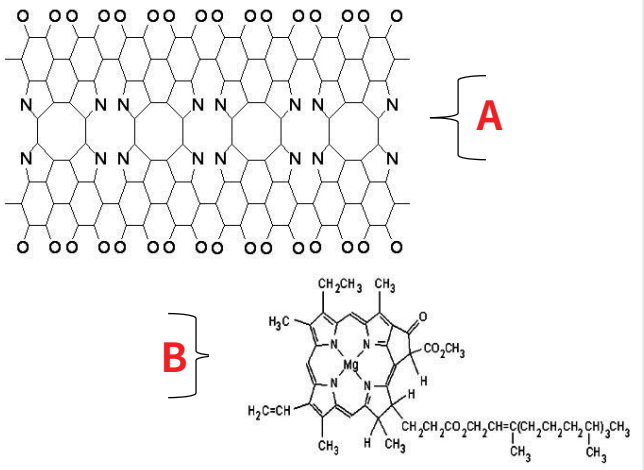


Fig. 3. The proposed (theoretical) formula of melanin. B Formula of chlorophyll.

In various research institutes, there has been a search to take advantage of the fact that chlorophyll splits from the water molecule to obtain hydrogen for energy purposes, but it turns out that once it is removed from the leaf, the chlorophyll becomes permanently inactive in 20 seconds. The University of California has been trying to improve this for 50 years without obtaining useful results.

This accompanied our initial doubts: if we remove melanin from the tissue and put it to produce energy, how long will it last? 30 seconds, 50 seconds?

To our surprise, it works for years, and if we perfect the technology, it is likely to work for decades or even centuries. That is, melanin is thousands of times more efficient at capturing the elementary particles of electromagnetic radiation (photons) than chlorophyll.

The question was how to extract energy from water? It is possible to extract energy from the water molecule by detaching and reattaching the hydrogen atoms from the oxygen.

The energy is produced from water with the following reaction:

$$2H_2O + \text{Melanin} + 2H^+ \xrightarrow{\text{NOT A WORD}} 2H_2 + O_2 + 4e^-$$

The schematized reaction means that two water molecules, plus melanin, and in the presence of the photons of electromagnetic radiation, symbolized by the sun, give us two molecules of hydrogen, one molecule of oxygen, and four high-energy electrons. But when the reaction occurs in the opposite direction, the hydrogen and oxygen atoms rejoin, giving us water and electricity, as the melanin does not undergo changes, since it only supports and catalyzes the reaction without any damage to its molecule.

Two water molecules and the electromagnetic radiation of the sun, in the presence of melanin, give us two molecules of hydrogen, one molecule of oxygen, and four high-energy electrons. The arrow indicating the direction of the reaction goes in both directions, and when the reaction goes from right to left, water and electricity are produced, and as complementary reactions, that is, one exergonic and the other endergonic, a cycle is established that lasts for years, as the melanin itself does not suffer any damage, since it only supports the reactions.

The melanin captures the energy of the photons, which are the elementary particles of electromagnetic radiation, and with that extracts hydrogen from water. The time it takes to re-collect the energy necessary to split the water molecule is

3 x 10-12 seconds and the reaction in melanin is reversible.

We estimate that one-third of the usual energy that humans possess comes from melanin, light, and water. But that third is the primary energy, that is, It is the equivalent of reactions activation energy main chemicals in the body, since according to Therapeutic results - which have been extraordinary -

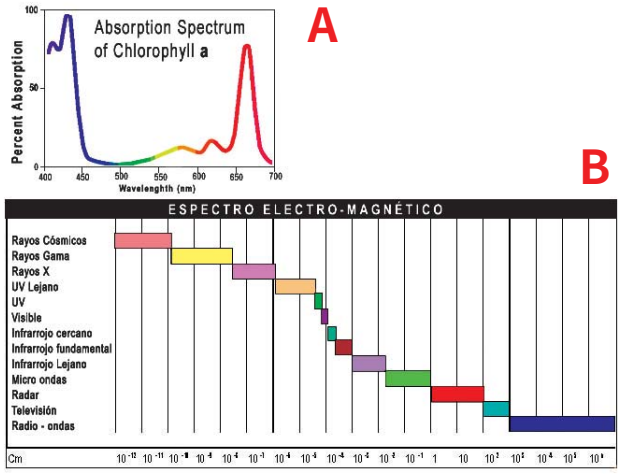
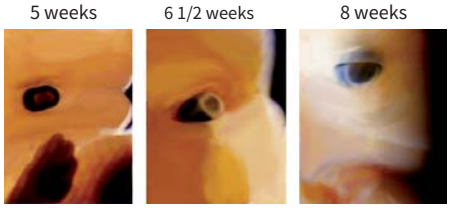


Fig. 4.
The absorption spectrum of chlorophyll, with its absorption peaks at 450 nanometers and 650 nanometers. B Espectro electromagnético de la melanina where there is a greater amplitude and efficiency, which absorbs thousands of times more photons than chlorophyll.

Fig. 5. Effects of melanin expression in some vegetables. For example, endos of eggplants: the genetic code of one expressed melanin, the other did not. It is undeniable that the vegetable that can absorb electromagnetic radiation means an extra energy supply for it, which allows it to obtain phenomenal advantages for life.



Photographs of the book: Born, the great adventure Lennart Nilsson, seventh edition, Salvat.

Fig. 6. Image of the eye at 35 days of a human pregnancy. The fetus's eye is completely filled with melanin. This substance is so important for existence that it forms immediately and provides energy to the tissues so that all the series of reactions that lead to life can take place.

totality of the systems are supported by one or another nera, or even require it to start and/or sustain (chemical energy generated by melanin from the photonic energy). This is congruent with the clinical findings resident while tolerating a person without drinking water. It will be date, it is only accepted that the water constitutes mainly the solvent or universal diluent, but if we add that it is also, together with the light and melanin, the source of the third part of the total energy used by the human body, and that we are very That energy is the one that initiates the most important processes, such as vision, for example, then it is more buying than the lack of water only three days, the lack of food, which is tolerated up to three months . (1)

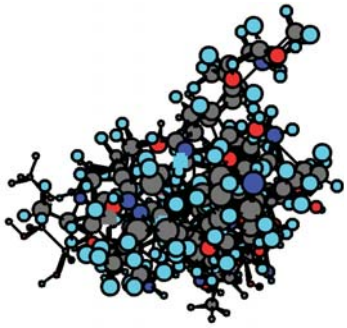


Fig. 7. Approximate three-dimensional structure of melanin.

We have compared this molecule in humans with the molecules of melanin in other species and were surprised to find that the molecule is the same in all species. It is capable of evolving in a Darwinian manner. Melanin is, without a doubt, a very important precursor of life.

In January 2005, while listening to a speech by the President of the United States, George W. Bush, who said: “We need substances that can separate hydrogen from water to fully enter the hydrogen era”. I thought, why not use melanin? I took on the task of finding the answer and solved it: they don't use it because, apart from me, no one else knew, and without giving it much thought, I started the patent process in June 2005: “Photoelectrochemical method for the separation of water into hydrogen and oxygen, using melanins, their analogs, precursors, or derivatives”.

(1) Initially, we thought that human photosynthesis represented the third part of daily energy requirements, but currently, in 2011, we believe it actually reaches 99% of the body's daily needs.

(2) By 2011, the patent had already been granted by several countries, including Russia and Mexico.

GENERATE ELECTRICITY

Another fundamental characteristic of melanin is its stabili ty in water, which is very important for the generation of e nergy. For example, the first sample we achieved without –

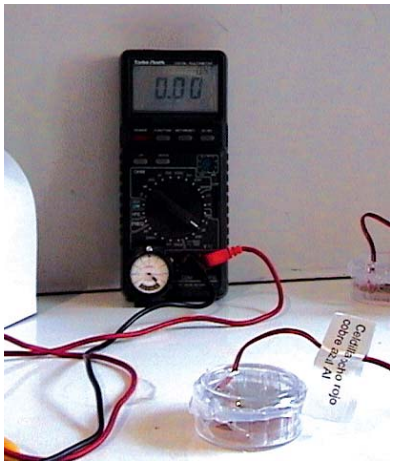


Fig. 8.
Prototype of a self-ren ewable photoelectroch emical cell connected t o a voltmeter, which al lowed measuring the c hanges in electric pote ntial upon introducing melanin (empty cell).

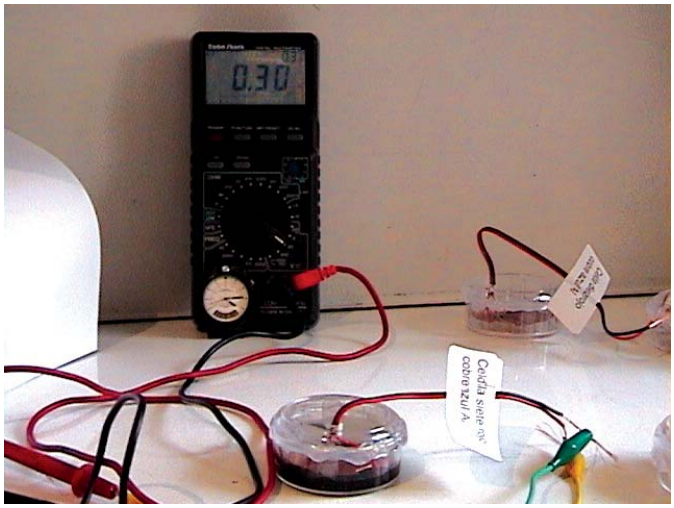


Fig. 9. Cell with melanin.

Installed in January 1998, it has lasted for thirte en years without any deterioration. The first cell s (prototypes) we made to generate electricity b egan in January 2007, and have been working c ontinuously at ambient temperature until now.

In Figure 8, the voltmeter reads zero when the container does not contain the melanin solution, in contrast, in Fig ure 9 the voltmeter reaches 300 millivolts and up to 470 millivolts as the concentration of the same increases. Additionally, once the cell is sealed, it does n ot require any form of recharging.

On March 13, 2007, we achieved the first solid-state light source (LEDs) that continues to emit intermitte nt light day and night to this day. Our cells are still e lementary, but they produce energy, and we are alr eady working to make them more efficient and scal e them with competitive costs. Initially, we used a c oncentration of 1.3% melanin and 98.7% water. Lat er, when we raised the concentration of melanin to 4%, the energy generation increased exponentially.

As for technological development, we have made signific ant advancements that I believe reflect the potential of s uch a cell. For example, at the beginning of 2006, I could produce one and a half liters of melanin every three mon ths, and the cells I had were 30 mL and produced 400 mV and about 10 uA. In March 2007, when I could turn on for the first time a solid-state light source, the cells we cou ld manufacture were 500 mL, producing about 500 mV an d 200 uA, but I could already produce about 50 liters of me lanin per day. For example, the modules I used for demon stration allowed me to power an LED with 10 500 mL cells.

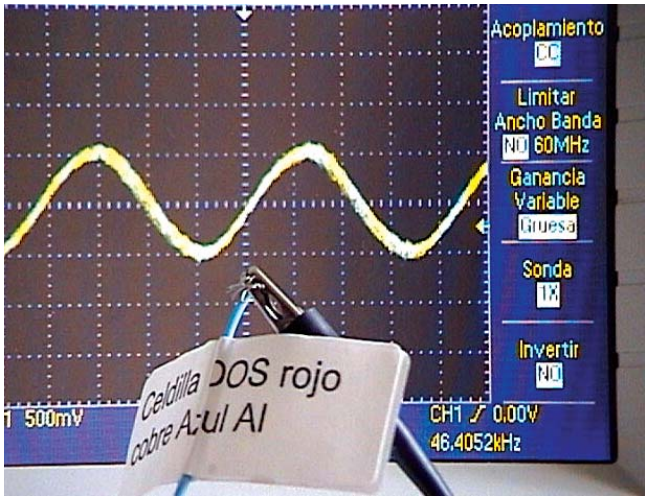
Recently, we were able to power a small music pla yer for the first time, but now each cell produces 6 00 mV and up to 200 mA, which is three zeros more than the 200 uA. Currently, in our small laboratory , we produce about 200 liters of melanin per day.

The current prospects are mainly focused on illum ination. We want to start illuminating extensively i n two years. That is, we have set the goal that in tw o years we should already have a design that is wo rth placing everywhere. In five years, we want an a rmed vehicle prototype, and the most interesting t hing is that it would be a vehicle that would never go to a gas station. We need economic support to i ntegrate interdisciplinary teams to scale up the cel l technology effectively and quickly, as we support our professions and this research together.

Notices that various European nations, as well as the Unit ed States, say they have budgeted one hundred billion do llars for the eventual construction of hydrogen gas statio ns, that is, gas stations that will deliver hydrogen, but the y do not know where they will get the hydrogen because f or now, hydrogen can only be obtained from gas and oil.

Under the current state of knowledge, one thousand liters

A



B

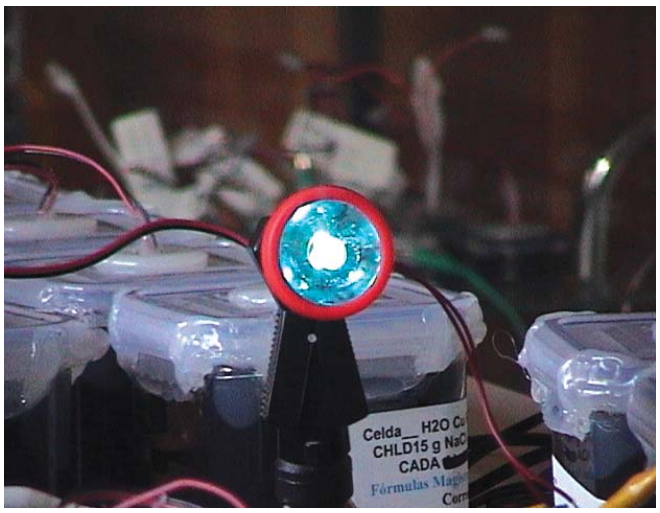


Fig. 10. An oscilloscope connected to the cell.
B LED on with cell.

melanin cells provide ten thousand volts and milliampere s, but these figures can be modified according to specific needs, that is, it can be modulated according to the size o f the cells, the shapes they connect to each other, the size and arrangement of the electrodes, modifications in the f ormula of the central substrate, etc., the possibilities are almost infinite, and according to Vladimir S. Bagotsky, wh o in his book Fundamentals of Electrochemistry, publishe d by Wiley, in the second edition, in 2007, clearly states o n page 22 that “in these types of designs, it is impossible t o predict”, in this sense, one must test everything.

IN THE FACE OF SKEPTICISM

Our proposal has encountered skepticism in some foru ms where we have presented it, as the concept that onl y plants, and not mammals, can perform photosynthesi s – that is, capture photonic energy and transform it int o useful chemical energy for the cell, in this case, vegeta ble – is deeply rooted. However, the article "Ionizing Ra diation Changes the Electronic Properties of Melanin an d Enhances the Growth of Melanized Fungi," written by Ekaterina Dadachova and colleagues from the Albert Ei nstein College of Medicine, New York (PLoS ONE 2(5): e457.doi:10.1371/journal.pone.0000457.

This article is very important because for the first time, a n independent team of researchers also finds findings co mpatible with our concepts that melanin has the ability t o perform photosynthesis, as well as a result of the obser vation of the biological effects of the same. This is explai nable given that it is accepted that melanin is "intractabl e" (The Physical and Chemical Properties of Eumelanin, Paul Meredith and Tadeusz Sarna, 2006, Blackwell Munk sgaard doi: 10.1111/j.1600-0749.2006.00345), which refer s to the fact that it has not been possible to discern the c hemical structure of it, so that we can infer and/or explai n, if not all, some of its extraordinary physicochemical pr operties. This study reaffirms the extraordinary difficulty of studying melanin and raises a very specific doubt:

Where does the photonic energy absorbed b y melanin go, which is also very much?

Our findings were also based on the observation of the biological effects of melanin on the human retina, but t he findings were controversial. However, we have been

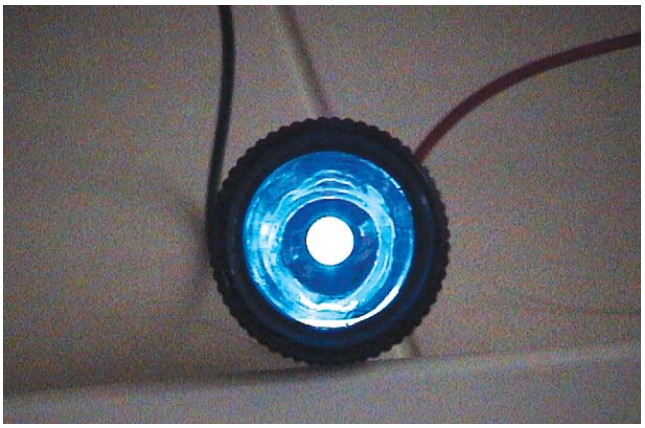


Fig.11. Small lamp lit with cells.

advancing, both in the development of applications in the alternative energy generation and in the preparat ion of drugs that modulate photosynthesis in humans,

based on the extraordinary therapeutic results they i nitiated the procedures for another patent in 2006.

In the article by Ekaterina Dadachova and colleagues, i t is stated that the mechanisms involved in their resear ch resemble the way plants obtain energy from photos ynthesis. The findings of this team should contribute to a faster acceptance of the results of our research, allo wing both scientists and government officials, as well a s entrepreneurs, to make better decisions regarding th e integration of multidisciplinary teams that allow the development of all applications as quickly as possible, both in the energy sector and in the field of medical ph armacology. In the latter field, the pharmacological mo dulation of photosynthesis in humans has exceeded

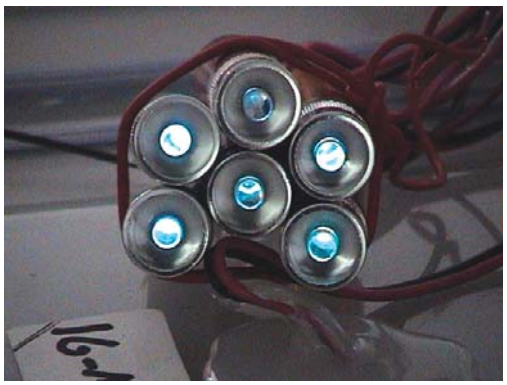


Fig. 12.
A Tabletop image with several connected cells.
B Group of LEDs illuminated with cells.

Fig. 13. Optical nerve.

expectations that were held, for example, for co nditions such as Alzheimer's, various types of art hritis, nephropathies, enteropathies, sepsis, etc.

TOWARDS THE FUTURE

Finally, it must be highlighted that there is a growing global concern about climate change. Each year, the trends of war ming accelerate and everything indicates that we are headi ng towards a global disaster. The imminence of physical dis asters in the event of not acting quickly will exceed all the ca pacities of governments and peoples to mitigate and confro nt this phenomenon and its consequences, experts assure. According to all the indications, climate change is alread y surpassing the actions planned in the Kyoto Protocol.

In the face of this situation, the development of s olutions based on melanin offers a light at the en d of the tunnel. I think it is worth examining and d eveloping it seriously. Perhaps a national project that transcends borders could be done. The dem and for an efficient, cost-effective, self-renewable photoelectrochemical cell will be overwhelming.

It will be difficult for me to achieve this individually in the short term. That's why I am in a phase of seeking support, not only fin ancial but also strategic, logistical, and technological, as a task of this magnitude requires many minds to cooperate and shine from their respective strongholds. Because this is a scientific reality that should be within our reach today.

Melanin: Energy of the Future

We have achieved, for the first time, alternative electricity generation using self-renewing photoelectrochemical cells which separate the hydrogen atom from water and then bring the atoms together again. This is a fundamental scientific breakthrough that could bring us closer to the hydrogen era.

B Y D R . ARTURO SOLÍS HERRERA

In 1990, we began to use computerized methods in my laboratory, in the city of Aguascalientes, to study the three main causes of blindness in Mexico. These methods allowed us to study the retina and the optic nerve in living beings in a very similar way to the technique known as spectrophotometry, in which a specific wavelength is applied to the retina and nerve and a characteristic image or response is obtained.

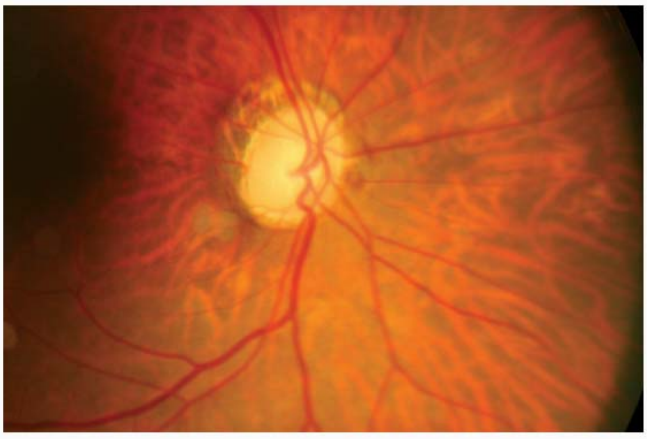


Fig. 1. In this picture we see a detailed image of the optical nerve, which is the circular structure, which measures the equivalent of 12 human hairs held together.

Upon changing the wavelength and/or using filters and means of contrast, as a kind of radar for penetration, we have obtained other images that give us important information for evaluating eye disease. During this research, we detected the important role played by melanin, a substance also known chemically as polihydroxyindol, which has extraordinary properties and all of them tend to do something to protect the tissues, but none of them seemed to explain such constant and complete protection.

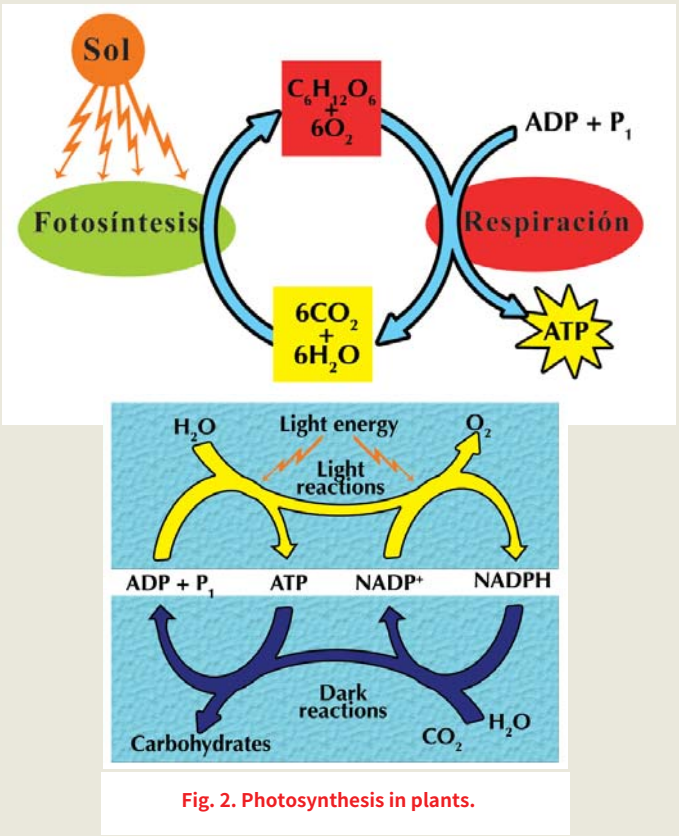


Fig. 2. Photosynthesis in plants.

We were able to extract the first 20 mililiters of melanin for the first time in 1998, since my idea was that if we could instill it in the human eye, we could achieve reasonable therapeutic effects.

The results we did in fact achieve were very impressive, indeed much better than we expected.

It took us 12 years, from 1990 to 2002, to understand how this substance worked so effectively. Finally, we could confirm our hypothesis – which was incredible even to ourselves – that melanin delivers hydrogen to the cell. In other words, it captures photonic energy and transforms it into chemical energy. This astonished us, given that hydrogen is the smallest atom of all, the most abundant in the universe, and it is the carrier of energy that nature uses most.

We can define photosynthesis as the absorption of photons from electromagnetic radiation, which brings about an anionic event.

Until today, chlorophyll is accepted to be the only substance widely disseminated in nature that is capable of delivering hydrogen to a plant cell.

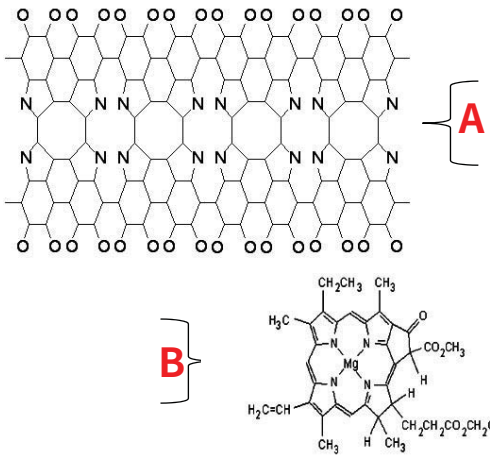


Fig. 3. A) Proposed (theoretical) formula of melanin.
B) Formula of chlorophyll.

No other substance has been known in eukaryotic cells (in mammals, fish, birds, insects, etc.) that, by capturing photons from electromagnetic radiation, can obtain the necessary energy to split the water molecule. Results obtained using melanin confirm to us that not only plants carry out photosynthesis, but that mammals can also do so. Indeed, so can any living being that has melanin in its genetic code. In other words, melanin is to the animal kingdom what chlorophyll is to the plant kingdom.

As can be seen in Fig.3, both compounds have certain similarities, particularly the four nitrogen atoms in the center. In the case of melanin, it would appear that Nature made a superchlorophyll, since chlorophyll has only one center of reaction, while chlorophyll has hundreds of centers of reaction per gram of the substance.

In several research institutes, attempts have been made to make use of chlorophyll's ability to split the water molecule in order to obtain hydrogen for energy purposes. However, it turns out that once chlorophyll is taken out of the leaf of a plant, it becomes permanently inactive 20 seconds later. The University of California has been trying to improve chlorophyll's activity level outside of plants for the past 50 years, without achieving useful results.

This fact led us to doubt the usefulness of our research. If we take melanin out of the tissue and make it produce energy, how long is the reaction going to last? Maybe 30 seconds or 50 seconds?

To our surprise, it functions for years and, if we perfect the technology, it might very well function for decades or may be even hundreds of years. In other words, melanin is many thousands of times more efficient in capturing particles of electromagnetic radiation (photons) than is chlorophyll.

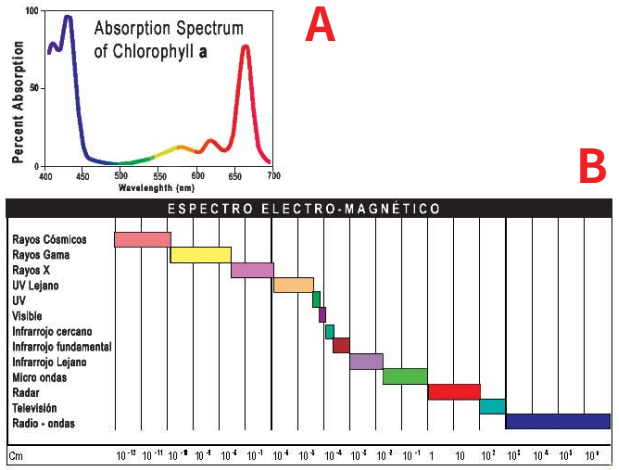


Fig. 4.
A Spectrum of absorption of chlorophyll, with its peaks of absorption at 450 and at 650 manometers.
B Electromagnetic spectrum of melanin, in which greater amplitude and efficiency is observed, as it absorbs thousands of times more photons than does chlorophyll.

The question was: How does melanin extract energy from water? In the water molecule, energy is extracted by separating and reuniting the hydrogen atoms from the oxygen atoms

Energy is produced from water in accordanc e with the following reaction (¤ = light).

$$2H_2O + \text{Melanin} \xrightarrow{¤} 2H_2 + O_2 + 4e^-$$

The reaction outlined above shows that two water molecule s, plus melanin, in the presence of photons of electromagnet ic radiation (symbolized by the sun), yield two hydrogen mol ecules, an oxygen molecule, and four electrons. However, w hen the reaction proceeds from right to left, the hydrogen an d oxygen atoms reunite, forming water and electricity, as the melanin does not undergo any change, since it only support s and catalyzes the reaction without any deterioration to its molecule. The arrow indicates that the reaction can proceed in both directions, and being complementary reactions, one exergonic and the other endergonic, a cycle is established th at lasts for years, as the melanin does not deteriorate.

The melanin captures photonic energy and uses i t to extract the hydrogen molecule from water. T he time required to recollect the energy needed t o split the water molecule is 3 x 10-12 seconds.

Fig. 5. Presence of melanin as see n in some plants, for instance, in t wo eggplants. Melanin is part of t he genetic code of one of them, b ut not of the other. It is undeniabl e that the plant that can absorb el ectromagnetic radiation receives an extra supply of energy, giving i t phenomenal advantages in life.

We have estimated that the third of all energy usual ly available to a human being comes from melanin, light and water. However, this third of all energy is t he primordial energy, that is, it is the energy that ac tivates chemical reactions in the human organism.

In line with our therapeutic studies (whose results have been extraordinary), life systems are supported by this energy on e way or another, or even require chemical energy from mela nin derived from photonic energy in order to begin or to sust ain life. This is coherent with clinical findings related to the ti me that a human being can live without water. Water is acce pted to be the universal solvent and diluting agent, but if

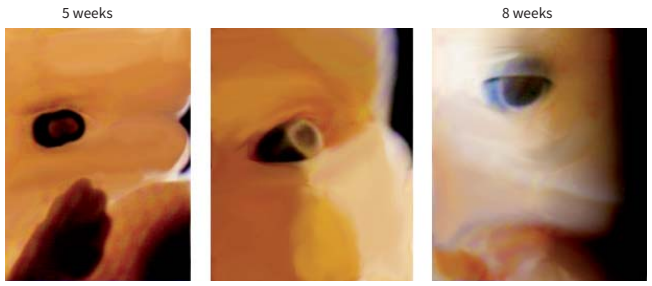


Fig. 6. Image of the human eye 35 days into pregnancy. The fetus' eye is completely full of melanin, a substance that is so important for life, that it forms immediately and provides energy to the tiss ues, so that all kinds of reactions can take place that lead to life.

We also add that it is also, in the presence of light and melanin , the source of one-third of the total energy used by the huma n body, and that this energy is key to initiating most importan t processes, such as sight. It can be more easily understood th at a human being can tolerate the lack of water for only three days, while he can go without food for up to three months. (1)

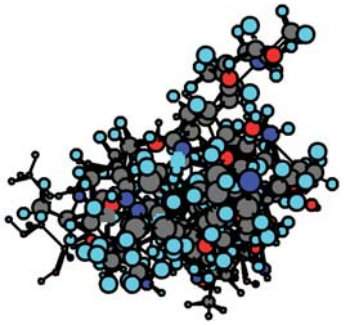


Fig. 7. Approximate three-dimensional s tructure of melanin.

We have compared this molecule in humans to mela nin molecules in other species and were surprised to find that the molecule is the same in all species. NA SA defines life as a self-sustaining chemical system c apable of evolving in a Darwinian manner. Melanin is , without a doubt, a very important precursor of life.

In January 2005, I listened to a speech by George W. Bush, President of the United States, who said that substance s are needed that can separate the hydrogen atom from water , so that we can fully enter into the hydrogen era. I wondered: Why don't they use melanin? I set about the t ask of finding the answer and I did find it.

(1) We initially thought that human photosynthesis accounted for a third of daily energy requirements, but now, in 2011, we belie ve that it actually totals 99% of the human body's daily needs.

They don't use melanin, because, apart from myself, no body else knew about it. Without giving it much though t, I decided, in June 2005, to begin proceedings on the p atent: "A new photoelectrochemical process for breakin g the water molecule into hydrogen and oxygen using melanins, their precursors, analogues, or derivatives".

GENERATING ELECTRICITY Another fundamental feature of melanin is its stability in water. This is vital for electri city generation. For instance, the first sample that we w ere able to extract in January 1998 began its ninth year without any kind of deterioration in January 2007. The fi rst cells (prototypes) we made with a view to generating electricity, this year began their sixth semester producin g electricity without interruption at room temperature.

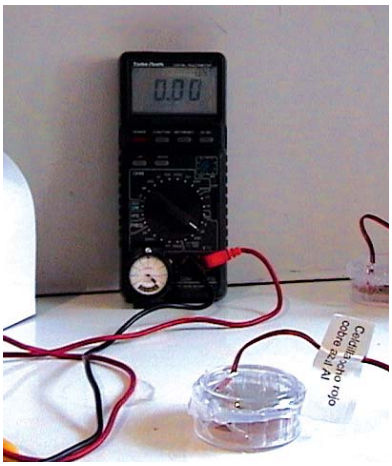


Fig 8. Prototype of a self-renewing photo electrochemical cell connected to a volt meter, allowing for measurement of cha nges in electric pote ntial, when using m elanin (empty cell).

In Fig. 8, a voltmeter registering zero current can be se en, as the recipient does not contain a melanin solutio n. In contrast, in Fig. 9, the voltmeter records 300 miliv olts or as much as 470 milivolts when the concentrati on of melanin is increased. Moreover, once the cell is s ealed, the cell does not require recharging in any way.

On March 13, 2007, we managed to light the first light-emitti ng diode (LED), which remains lit six months later and lights our laboratory day and night. Our cells are still very element ary, but they do produce electricity and we are working on m aking them more efficient and scaling them up to competitiv e costs. Initially, we used a concentration of 1.3% melanin

[2] The license had already been issued by various cou ntries for 2011, among which Russia and Mexico.

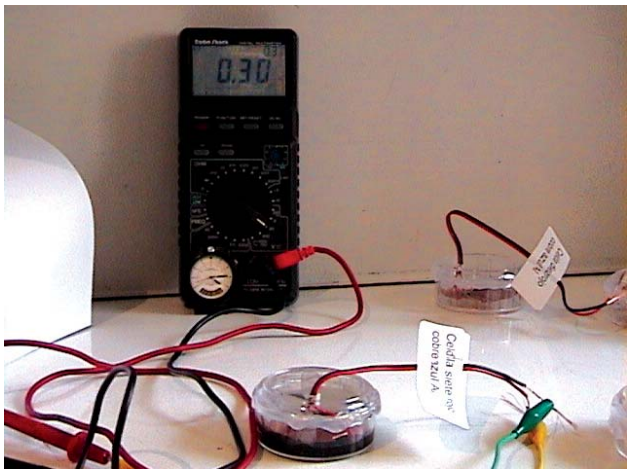


Fig 9. Cell with melanin.

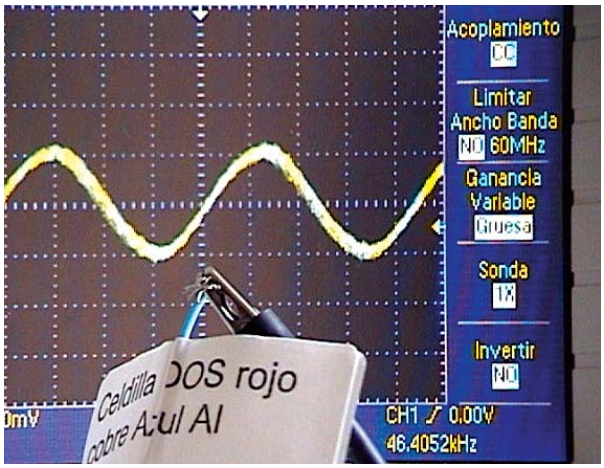
and 98.7% water. Later, when we increased t he concentration of melanin to 4%, the gene ration of electricity increased exponentially.

In terms of technological development, we have achieved p rogress I consider to be significant and which can reflect th e potential of such cells. For instance, early in 2006, we wer e producing a liter and a half of melanin every three month s and our cells were of 30 mL and produced 400 mV and 10 uA. In March 2007, when we were able to light a LED for the first time, the cells we were making were of 500 mL and pro duced 500 mV and 200 uA. By this time, we could produce a bout 50 liters of melanin daily. The modules we used for de monstration allowed us to light a LED with ten 500 mL cells.

More recently, we were able to connect up a small music pla yer, since each cell now produces 600 mV and 200 mA, that is , a thousand times more than the 200 uA we used to achieve.

Currently, in our small laboratory, we produc e about 200 liters of melanin daily.

The perspectives, for now, mainly have to do with lighting. We would hope to do lighting on a more massive scale within t wo years and to have the right kind of designs for that. Within five years, we think it might be feasible to put together a proto type vehicle and the most interesting aspect of this would be t hat this vehicle would never have to go into a gasoline station. We will need economic support to integrate interdisciplina ry teams to scale up this fuel-cell technology in an effective and rapid manner, since we are currently exercising our pr ofessions and carrying out this research simultaneously.



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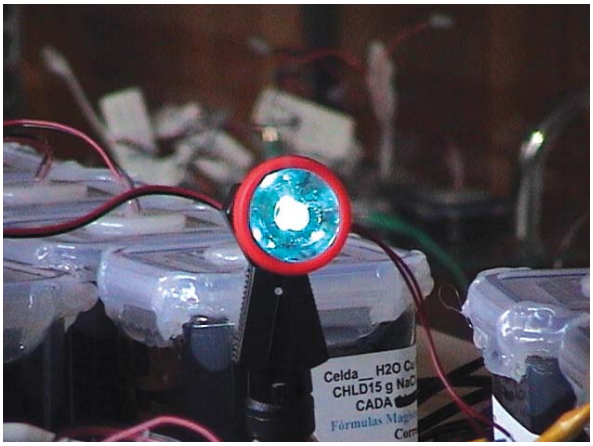


B

Fig. 10. An oscilloscope connected to the cell.
The LED is lit by the cell.

It should be taken into account that several European n ations, as well as the United States, say they have budge ted 100 billion dollars for the possible future constructio n of "hydro-gasoline stations," that is, stations that will s ell hydrogen for vehicles. At this time, they do not know where they will get the hydrogen from, because, for now , hydrogen can only be obtained from gas or from oil.

In line with our current knowledge, 1,000 liters of melanin pr ovide 10,000 volts, plus milliamperes, but these figures can be modified to specific needs, that is, it can be modulated a ccording to the size of the cells, the way the cells are connec ted to each other, the size and the arrangement of the electr odes, modifications in the formula of the central substrate, etc. In other words, the possibilities are almost infinite and much work will be required to discover and develop them.

Vladimir S. Bagotsky says on page 22 of his book, F undamentals of Electrochemistry, published by Wi ley (second edition, 2007), in designing electroche mical systems, it is impossible to predict how they will work out and all options have to be tested.

RESPONDING TO SKEPTICISMOur research has en countered some skepticism when we have presen ted it to different people, since the concept that p hotosynthesis occurs only in plants and not in ma mmals is very deeply ingrained in people's minds.

However, in March 2007, the article “Ionizing Radiation Chan ges the Electronic Properties of Melanin and Enhances the Gr owth of Melanized Fungi” was published by Ekaterina Dadac hova and her colleagues at the Albert Einstein College of Med icine, New York (PLoS ONE 2(5): e457. doi:10.1371/journal.po ne.0000457). This article is very important because, finally, a n independent research team has made findings that are co mpatible with our theory that melanin has the ability to carr y out photosynthesis, also reaching this conclusion by obser ving the biological effects of melanin. This is explainable in t he sense that melanin is accepted to be “intractable” (The P hysical and Chemical Properties of Eumelanin, Paul Meredith and Tadeusz Sarna, 2006, Blackwell Munksgaard doi: 10.1111/j.1600- 0749.2006.00345), which refers to the fact tha t it has been impossible to discern the chemical structure of melanin. If we could do so, this would allow us to infer or expl ain if not all, at least some, of its extraordinary physical and c hemical properties. Meredith reaffirms the great difficulty in

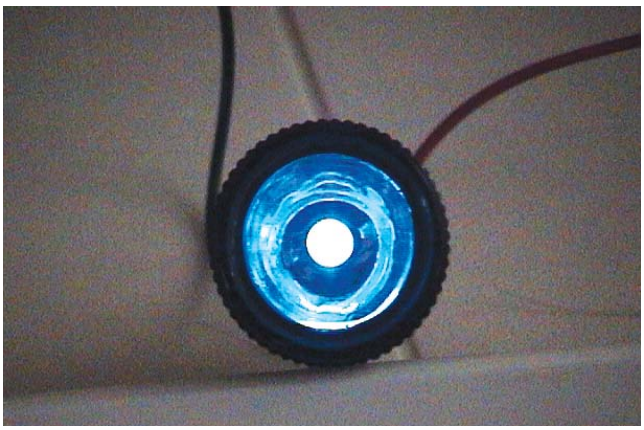


Fig.11. LED illuminated by the cell.

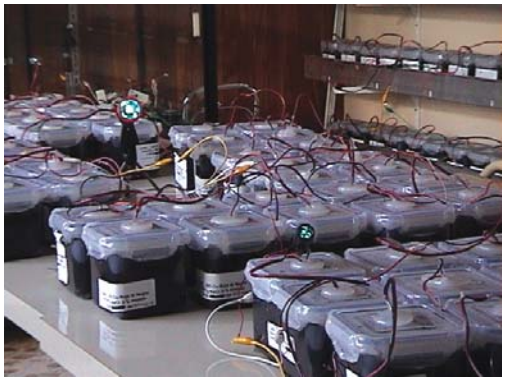
Studying melanin and stating a very concrete qu estion: Where does the enormous amount of ph otonic energy go, which is absorbed by melanin?

Our findings are based on the observation of the biologi cal effects of melanin on the human retina and may still be controversial. However, we have been progressing bo th in the development of applications for alternative ele ctricity generation and in the production of medicines th at modulate photosynthesis in humans, paying attentio n, of course, to all the bioethical and legal aspects that a re implicit. We began proceedings on another patent in 2006 based on the extraordinary therapeutic benefits.

In the article by Dadachova and colleagues, the observa-tions in their research are compared to the way plants obtainener gy from photosynthesis. Their findings should contributeto m ore rapid acceptance of the results of our research, al-lowing scientists, government officials and businesspeople tomake b etter decisions regarding integrating multidisciplinaryteams t hat can develop, as quickly as possible, all applications,

Fig. 13. Optic nerve.

both in the field of energy and in the area of medical pha rma-cology. In the latter field, the pharmacological mod ulation ofphotosynthesis in human beings offers major e xpectations inailments such as Alzheimer, different type s of arthritis, neph-ropathy, enteropathy, sepsis, etc.



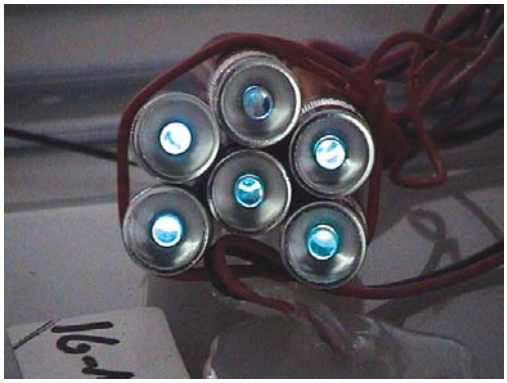


Fig. 12.
A work table with several cells conn ected by B Group of LEDs lit by cells.

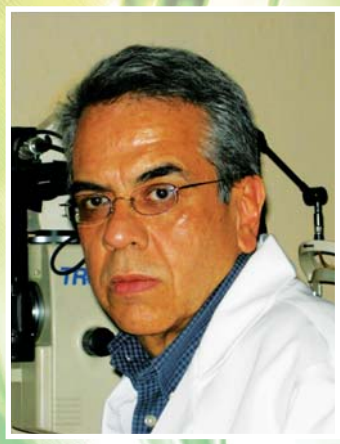
LOOKING TO THE FUTURE

Finally, one must underline the growing global concerno n climate change. Global warming trends are gaining mo -mentum and it would appear that we are heading towa rds a di-saster situation, if the trends are not reversed. T he imminenceof catastrophes, if rapid action is not take n, will go beyond theability of governments and peoples to mitigate and face thisphenomenon and its conseque nces, experts say. Signs are thatclimate change is outstri pping the measures foreseen in theKyoto Protocol.

Facing this reality, the development of solutions based on melanin may be able to offer a light at the end of the tunn el... I believe it is worthwhile studying this and developing it seriously. Perhaps a national research project could be c arried out that could go beyond our borders. The demand for an efficient, self-renewing photoelectrochemical cell, f rom a cost-benefit perspective, could be overwhelming.

It is something that I personally could hardly expect to ac hieve in the short term. That is why I am at a stage of seeki ng support, not only financially, but strategically, logistica lly, and technologically, because a task of this scope requi res many brilliant minds, each working in their own directi on. But it is a possibility that should be within our reach.

(Woohoo. Well, GIA a Debate.com)



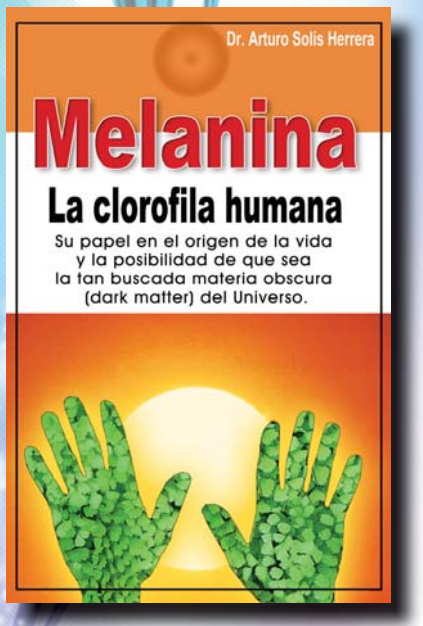
Dr. Artur
o Solís
Herrara

Mr. Solis Herrera graduated as a medical surgeon from the National Polytechnical Institute (IPN), as an ophthalmologi st from the National Autonomous University of Mexico (UN AM), and as a neuro-ophthalmologist from the National Inst itute of Neurology and Neurosurgery (INNN).

He is a master of medical sciences from the Autonomous U niversity of Aguascalientes and doctor in pharmacology fro m the University of Guadalajara.

Currently, he works as technical director at the chemical an d pharmaceutical company Formulas Magistrales in the cit y of Aguascalientes.

In 2009 he wrote the book: "Melanin, The Human Chlorophyll".



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